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12/31/2003

Stephen F. Smith

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09/12/2007

JOHN BRUCKNER, P.C.

P.O. BOX 490

FLAGSTAFF, AZ 86002

EXAMINER

BURD, KEVIN MICHAEL

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/750,432	Applicant(s) SMITH ET AL. <i>len</i>	
	Examiner Kevin M. Burd	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 June 2007.
 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4,6-12,14-19,33-46,49,51-59,61-66 and 68-74 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 1,4,6-12,14-19,33-46,49,51-59,61-66 and 68-74 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

1. This office action, in response to the remarks filed 6/18/2007, is a non-final office action.

Response to Arguments

2. Applicant's arguments, see the remarks filed 6/18/2007, with respect to the rejections of claims 1, 4, 6-12, 14-19, 33-46, 49, 51-59, 61-66 and 68-74 have been fully considered and are persuasive. Applicant pointed out Lee (US 6,584,140) does not disclose fast frequency hopping since Lee discloses, in column 8, lines 27-42, a hop occurs once every six bits. Therefore, the rejection has been withdrawn. However, upon further consideration, new grounds of rejection are made in view of Alamouti et al (US 6,853,629) in view of Fathallah et al (US 6,381,053).
3. The previous rejection of the claims under 35 USC 101 is withdrawn in view of the amendment.
4. Applicant specifically addressed the previous rejection of claims 7, 9, 10, 33, 34, 36, 49, 51, 53-55, 59, 61, 68 and 70-72. Applicant states on page 19 of the remarks, Alamouti recites well-known textbook combinations of hybrid CDMA (spread spectrum) protocols, including DS/FH, DS/TH, FH/TH and DS/FH/TH. The examiner agrees. In addition, applicant states the polarization diversity described in Alamouti is not valid for the high-multipath environments addressed by the instant invention. The examiner disagrees. Alamouti states polarization diversity receive systems can provide performance improvement over single linear polarization channel in a strong multipath

environment (column 28, lines 38-45). Therefore, Alamouti advantageously uses the polarization diversity system in a strong multipath environment.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 6, 7, 9, 10, 12, 14-19, 33, 34, 36-44, 46, 49, 51, 53, 54, 56, 57, 59, 61-66, 68, 70, 71, 73 and 74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alamouti et al (US 6,853,629) in view of Fathallah et al (US 6,381,053).

Regarding claims 1, 12 and 14, Alamouti discloses a method of modulating a carrier frequency of a direct sequence spread spectrum signal by frequency hopping. Column 2, lines 41-46 discloses well known hybrid CDMA systems comprising direct sequence/frequency hopping (DS/FH). Alamouti discloses the DS-CDMA protocol in greater detail in column 2, lines 12-27. DS-CDMA protocol spreads a user's data signal over a wide portion of the frequency spectrum by modulating the data signal with a unique code signal that is of higher bandwidth than the data signal (column 2, lines 12-21). Alamouti discloses the frequency hopping spread spectrum (FHSS) protocol in greater detail in column 2, lines 28-37. The FHSS protocol uses a unique code to change a value of the narrow band carrier frequency for successive bursts of the user's data signal (column 2, lines 28-33). The DS-CDMA and FHSS are the protocols

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combined in the hybrid DS/FH. Alamouti does not disclose the type of frequency hopping used in the DS/FH hybrid CDMA system. Fathallah discloses types of frequency hopping systems in column 1, lines 31-47. Slow frequency hopping (SFH) means that only one frequency-hop is achieved per bit, however, fast frequency hopping (FFH) means that a number of frequency hops are achieved for every information bit. FFH allows many hops to occur per bit; many more hops than are conducted in slow frequency hopping. The additional hops enhance security and allow data to overcome noise and interference. Hops occur much more often and less data will be transmitted on frequencies that are experiencing interference. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the fast frequency hopping protocol of Fathallah into the hybrid CDMA system that employs DS/FH.

Regarding claim 6, the frequency hopping comprises hopping throughout the entire frequency band.

Regarding claim 7, Alamouti discloses a hybrid CDMA system employing direct sequence/frequency hopping/time hopping (DS/FH/TH) (column 2, lines 41-46).

Regarding claims 9 and 10, the combination of Alamouti and Fathallah discloses the method stated above. The combination does not disclose splitting the hybrid signal into two identical components and modulating one of the components wherein the two antennas define an orthogonal polarization. A different embodiment of Alamouti discloses using polarization diversity to enable a base station to efficiently communicate with many remote stations (column 7, lines 28-32). This is possible because the

antennas at the base station are designed to distinguish orthogonally polarized signals (column 7, lines 32-38). The antennas are shown in figure 1. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of polarization diversity of the embodiment of Alamouti into the combination of Alamouti and Fathallah.

Regarding claim 15, Alamouti discloses an apparatus for modulating a carrier frequency of a direct sequence spread spectrum signal by frequency hopping. Column 2, lines 41-46 discloses well known hybrid CDMA systems comprising direct sequence/frequency hopping (DS/FH). Alamouti discloses the DS-CDMA protocol in greater detail in column 2, lines 12-27. DS-CDMA protocol spreads a user's data signal over a wide portion of the frequency spectrum by modulating the data signal with a unique code signal that is of higher bandwidth than the data signal (column 2, lines 12-21). Alamouti discloses the frequency hopping spread spectrum (FHSS) protocol in greater detail in column 2, lines 28-37. The FHSS protocol uses a unique code to change a value of the narrow band carrier frequency for successive bursts of the user's data signal (column 2, lines 28-33). The DS-CDMA and FHSS are the protocols combined in the hybrid DS/FH. Alamouti does not disclose the type of frequency hopping used in the DS/FH hybrid CDMA system. Fathallah discloses types of frequency hopping systems in column 1, lines 31-47. Slow frequency hopping (SFH) means that only one frequency-hop is achieved per bit, however, fast frequency hopping (FFH) means that a number of frequency hops are achieved for every information bit. FFH allows many hops to occur per bit; many more hops than are

conducted in slow frequency hopping. The additional hops enhance security and allow data to overcome noise and interference. Hops occur much more often and less data will be transmitted on frequencies that are experiencing interference. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the fast frequency hopping protocol of Fathallah into the hybrid CDMA system that employs DS/FH.

Regarding claims 16-19, the combination of Alamouti and Fathallah does not disclose amplifying the transmitted signal. Official notice is taken that the amplification of signals prior to transmission is well known in the art of signal transmission. The amplification of signals allows noise in the transmission medium to be overcome and the transmitted signal to be recovered properly at the receiver. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine an amplification circuit with the DS/FH hybrid CDMA system of the combination of Alamouti and Fathallah.

Regarding claims 33, 34, 68, 70 and 71, Alamouti discloses a method of modulating a carrier frequency of a direct sequence spread spectrum signal by frequency hopping. Column 2, lines 41-46 discloses well known hybrid CDMA systems comprising direct sequence/frequency hopping (DS/FH). Alamouti discloses the DS-CDMA protocol in greater detail in column 2, lines 12-27. DS-CDMA protocol spreads a user's data signal over a wide portion of the frequency spectrum by modulating the data signal with a unique code signal that is of higher bandwidth than the data signal (column 2, lines 12-21). Alamouti discloses the frequency hopping spread spectrum (FHSS)

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protocol in greater detail in column 2, lines 28-37. The FHSS protocol uses a unique code to change a value of the narrow band carrier frequency for successive bursts of the user's data signal (column 2, lines 28-33). The DS-CDMA and FHSS are the protocols combined in the hybrid DS/FH. Alamouti does not disclose the type of frequency hopping used in the DS/FH hybrid CDMA system. Fathallah discloses types of frequency hopping systems in column 1, lines 31-47. Slow frequency hopping (SFH) means that only one frequency-hop is achieved per bit, however, fast frequency hopping (FFH) means that a number of frequency hops are achieved for every information bit. FFH allows many hops to occur per bit; many more hops than are conducted in slow frequency hopping. The additional hops enhance security and allow data to overcome noise and interference. Hops occur much more often and less data will be transmitted on frequencies that are experiencing interference. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the fast frequency hopping protocol of Fathallah into the hybrid CDMA system that employs DS/FH. The combination does not disclose splitting the hybrid signal into two identical components and modulating one of the components wherein the two antennas define an orthogonal polarization. A different embodiment of Alamouti discloses using polarization diversity to enable a base station to efficiently communicate with many remote stations (column 7, lines 28-32). This is possible because the antennas at the base station are designed to distinguish orthogonally polarized signals (column 7, lines 32-38). The antennas are shown in figure 1. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to

combine the teachings of polarization diversity of the embodiment of Alamouti into the combination of Alamouti and Fathallah.

Regarding claim 36, Alamouti further discloses hybrid CDMA systems that employ direct sequence/frequency hopping/time hopping (DS/FH/TH) in column 2, lines 38-46.

Regarding claims 37, 41-44, 46, 73 and 74, Alamouti discloses an apparatus for modulating a carrier frequency of a direct sequence spread spectrum signal by frequency hopping. Column 2, lines 41-46 discloses well known hybrid CDMA systems comprising direct sequence/frequency hopping (DS/FH). Alamouti discloses the DS-CDMA protocol in greater detail in column 2, lines 12-27. DS-CDMA protocol spreads a user's data signal over a wide portion of the frequency spectrum by modulating the data signal with a unique code signal that is of higher bandwidth than the data signal (column 2, lines 12-21). Alamouti discloses the frequency hopping spread spectrum (FHSS) protocol in greater detail in column 2, lines 28-37. The FHSS protocol uses a unique code to change a value of the narrow band carrier frequency for successive bursts of the user's data signal (column 2, lines 28-33). The DS-CDMA and FHSS are the protocols combined in the hybrid DS/FH. The base station of figure 1 discloses splitting the output signal for transmission to the remote users. Alamouti does not disclose the type of frequency hopping used in the DS/FH hybrid CDMA system. Fathallah discloses types of frequency hopping systems in column 1, lines 31-47. Slow frequency hopping (SFH) means that only one frequency-hop is achieved per bit, however, fast frequency hopping (FFH) means that a number of frequency hops are achieved for every

information bit. FFH allows many hops to occur per bit; many more hops than are conducted in slow frequency hopping. The additional hops enhance security and allow data to overcome noise and interference. Hops occur much more often and less data will be transmitted on frequencies that are experiencing interference. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the fast frequency hopping protocol of Fathallah into the hybrid CDMA system that employs DS/FH.

Regarding claims 38-40, the combination of Alamouti and Fathallah does not disclose amplifying the transmitted signal. Official notice is taken that the amplification of signals prior to transmission is well known in the art of signal transmission. The amplification of signals allows noise in the transmission medium to be overcome and the transmitted signal to be recovered properly at the receiver. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine an amplification circuit with the DS/FH hybrid CDMA system of the combination of Alamouti and Fathallah.

Regarding claims 49, 51, 53, 59 and 61, Alamouti discloses a method of modulating a carrier frequency of a direct sequence spread spectrum signal by frequency hopping. Column 2, lines 41-46 discloses well known hybrid CDMA systems comprising direct sequence/frequency hopping/time hopping (DS/FH/TH). Alamouti discloses the DS-CDMA protocol in greater detail in column 2, lines 12-27. DS-CDMA protocol spreads a user's data signal over a wide portion of the frequency spectrum by modulating the data signal with a unique code signal that is of higher bandwidth than

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the data signal (column 2, lines 12-21). Alamouti discloses the frequency hopping spread spectrum (FHSS) protocol in greater detail in column 2, lines 28-37. The FHSS protocol uses a unique code to change a value of the narrow band carrier frequency for successive bursts of the user's data signal (column 2, lines 28-33). Alamouti discloses the time hopping CDMA (TH-CDMA) protocol in greater detail in column 2, lines 38-41. The TH-CDMA protocol uses a single, narrow bandwidth, carrier frequency to send bursts of the user's data at intervals determined by the user's unique code (column 2, lines 38-41). The DS-CDMA, FHSS and TH-CDMA are the protocols combined in the hybrid DS/FH/TH. Alamouti does not disclose the type of frequency hopping used in the DS/FH/TH hybrid CDMA system. Fathallah discloses types of frequency hopping systems in column 1, lines 31-47. Slow frequency hopping (SFH) means that only one frequency-hop is achieved per bit, however, fast frequency hopping (FFH) means that a number of frequency hops are achieved for every information bit. FFH allows many hops to occur per bit; many more hops than are conducted in slow frequency hopping. The additional hops enhance security and allow data to overcome noise and interference. Hops occur much more often and less data will be transmitted on frequencies that are experiencing interference. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the fast frequency hopping protocol of Fathallah into the hybrid CDMA system that employs DS/FH/TH.

Regarding claim 54, the frequency hopping comprises hops thought the entire frequency band.

Regarding claims 56 and 57, the combination of Alamouti and Fathallah discloses the method stated above. The combination does not disclose splitting the hybrid signal into two identical components and modulating one of the components wherein the two antennas define an orthogonal polarization. A different embodiment of Alamouti discloses using polarization diversity to enable a base station to efficiently communicate with many remote stations (column 7, lines 28-32). This is possible because the antennas at the base station are designed to distinguish orthogonally polarized signals (column 7, lines 32-38). The antennas are shown in figure 1. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of polarization diversity of the embodiment of Alamouti into the combination of Alamouti and Fathallah.

Regarding claims 62-66, Alamouti discloses an apparatus for modulating a carrier frequency of a direct sequence spread spectrum signal by frequency hopping. Column 2, lines 41-46 discloses well known hybrid CDMA systems comprising direct sequence/frequency hopping (DS/FH). Alamouti discloses the DS-CDMA protocol in greater detail in column 2, lines 12-27. DS-CDMA protocol spreads a user's data signal over a wide portion of the frequency spectrum by modulating the data signal with a unique code signal that is of higher bandwidth than the data signal (column 2, lines 12-21). Alamouti discloses the frequency hopping spread spectrum (FHSS) protocol in greater detail in column 2, lines 28-37. The FHSS protocol uses a unique code to change a value of the narrow band carrier frequency for successive bursts of the user's data signal (column 2, lines 28-33). The DS-CDMA and FHSS are the protocols

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combined in the hybrid DS/FH. Alamouti does not disclose the type of frequency hopping used in the DS/FH hybrid CDMA system. Fathallah discloses types of frequency hopping systems in column 1, lines 31-47. Slow frequency hopping (SFH) means that only one frequency-hop is achieved per bit, however, fast frequency hopping (FFH) means that a number of frequency hops are achieved for every information bit. FFH allows many hops to occur per bit; many more hops than are conducted in slow frequency hopping. The additional hops enhance security and allow data to overcome noise and interference. Hops occur much more often and less data will be transmitted on frequencies that are experiencing interference. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the fast frequency hopping protocol of Fathallah into the hybrid CDMA system that employs DS/FH. The combination of Alamouti and Fathallah does not disclose amplifying the transmitted signal. Official notice is taken that the amplification of signals prior to transmission is well known in the art of signal transmission. The amplification of signals allows noise in the transmission medium to be overcome and the transmitted signal to be recovered properly at the receiver. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine an amplification circuit with the DS/FH hybrid CDMA system of the combination of Alamouti and Fathallah.

6. Claims 4, 35 and 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Alamouti et al (US 6,853,629) in view of Fathallah et al (US 6,381,053) further in view of Swanke (US 5,521,533).

Regarding claims 4, 35 and 52, the combination of Alamouti and Fathallah discloses the method stated above in paragraph 5. The combination does not disclose directly synthesizing a digital signal. Swanke discloses the use of direct digital synthesizers in frequency hopping systems (figure 1). The synthesizers receive synchronized frequency hopping control signals from a frequency spread sequencer. The mixer yields a constant resultant frequency output signal of greatly suppressed signal distortion during the hopping sequence (column 2, lines 25-31). For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the direct digital synthesizer of Swanke into the combination of Alamouti and Fathallah.

7. Claims 8, 55 and 72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alamouti et al (US 6,853,629) in view of Fathallah et al (US 6,381,053) further in view of Beard (US 7,230,971).

Regarding claims 8, 55 and 72, the combination of Alamouti and Fathallah discloses the method stated above in paragraph 5. The combination does not disclose one or more pseudo random control codes are selected from the group consisting of direct subsets, rolling code segments, scrambling of code vectors and table based reassignments of the bit pattern relationship. Beard discloses a method and apparatus

for providing a pseudo random sequence for a spread spectrum system that prevents interception and provides real estate and power consumption efficiency (abstract).

Beard discloses a plurality of channels may be associated with a unique and distinct pseudo random sequence and each channel of a frequency band may be associated with a pseudo random sequence. A pseudo random sequence may be retrieved by an apparatus operating in accordance with the present invention through a look-up table and could be utilized to create a hop set for a frequency hopping spread spectrum system (column 3, lines 28-50). The pseudo random codes are table based and assigned and reassigned according to the transmit channel. The use of a table to utilize the pseudo random sequences eliminates the need for additional components to carry out computations to derive the sequences since the sequences have already been calculated. This will provides real estate and power efficiency as stated in the abstract. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the method and apparatus for providing a pseudo random sequence of Beard into the method of the combination of Alamouti and Fathallah.

8. Claims 11, 45, 58 and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alamouti et al (US 6,853,629) in view of Fathallah et al (US 6,381,053) further in view of Becker (6,726,099).

Regarding claims 11 and 69, the combination of Alamouti and Fathallah discloses the method stated above in paragraph 5. The combination does not disclose the method comprising transmitting the signal to a radio frequency tag and receiving

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information from the radio tag. Becker discloses transmitting an RFID tag and receiving information from the tag (figures 1 and 2). It is known to attach RFID tags to articles to be monitored (column 1, lines 41-55). This can be used for security or for inventory management. For these reasons, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the RFID transmission and reception system of Becker into the combination of Alamouti and Fathallah.

Regarding claims 45 and 58, the combination of Alamouti and Fathallah discloses the apparatus stated above in paragraph 5. The combination does not disclose the apparatus comprises a radio frequency tag. Becker discloses transmitting an RFID tag and receiving information from the tag (figures 1 and 2). It is known to attach RFID tags to articles to be monitored (column 1, lines 41-55). This can be used for security or for inventory management. For these reasons, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the RFID tag of Becker into the combination of Alamouti and Fathallah.

Conclusion

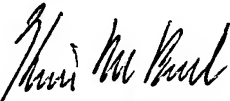
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Burd whose telephone number is (571) 272-3008. The examiner can normally be reached on Monday - Friday 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on (571) 272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin M. Burd
9/8/2007


KEVIN BURD
PRIMARY EXAMINER